

REMARKS

Claims 1-11 and 13-29 are all the claims presently pending in the application.

Claims 1-7, 9-11, 13-16, and 18-27 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Admitted Prior Art in view of Japanese Laid Open Patent Publication (JLOPP) (HEI 6-196609) and Kim, et al. (U.S. Patent No. 6,016,176).

This rejection is respectfully traversed in view of the following discussion.

It is noted that the amendments are made only to more particularly define the invention and not for distinguishing the invention over the prior art, for narrowing the scope of the claims, or for any reason related to a statutory requirement for patentability.

It is further noted that, notwithstanding any claim amendments made herein, Applicant's intent is to encompass equivalents of all claim elements, even if amended herein or later during prosecution.

I. THE CLAIMED INVENTION

Applicant's invention, as disclosed and claimed, for example by claim 1, and similarly by independent claims 10 and 13, is directed to a tape carrier type semiconductor device.

The device includes a flexible substrate on whose surface wiring is formed, and a driver circuit which is mounted on the flexible substrate and drives a device connected to the flexible substrate. The flexible substrate includes a first slit having a connector situated intermediate for connecting both internal ends of the first slit to reduce warpage. The first slit includes a first sub-slit and a second sub-slit with the connector therebetween. (See Page 3, lines 9-21; Page 8, lines 25-Page 9, line 6 and lines 17-23; and Figures 4 and 9).

Conventional tape carrier-type semiconductors have a stress-releasing slit which does

not include two sub-slits and a bridge and, sometimes include, a reinforcement plate.

However, neither configuration prevents warpage due to the different heat expansion coefficients caused by the resin on the one surface of the flexible substrate and the solder resist applied to the other side of the flexible substrate. Thus, the warpage may prevent the tape carrier device, a liquid crystal display and the print substrate from being “desirably” connected. (See Page 1, line 22-Page 2, line 20; and Figures 10A and 10B).

An aspect of the present invention includes the first slit includes a first sub-slit and a second sub-slit with the connector therebetween. This configuration reduces “the warp of the tape carrier type semiconductor device” caused by the two different heat expansion coefficients of the resin and the solder resist exerted on the flexible substrate during manufacturing, and thus prevents the outer terminal from detaching from the print substrate and the liquid crystal panel. (See Page 1, line 27-Page 2, line 3; Page 2, lines 24-26; Page 3, lines 9-11; Page 6, lines 13-17; Page 8, lines 25-Page 9, line 6 and lines 17-23; and Figures 4 and 9).

As a result, a tape carrier type semiconductor device is easily manufactured and unlikely to warp. (See Page 3, lines 11-13; and Page 8, lines 10-15).

II. THE 35 U.S.C. § 112, Second Paragraph, Rejections

Applicant respectfully traverses the indefiniteness rejection regarding the use of the word “substantially” in claims 6, 8 incorporated into claim 1, 10 and 25. In a very recent decision, the U.S. Court of Appeals for the Federal Circuit indicated that “expressions like ‘substantially’ are used to accommodate minor variations appropriate to secure an invention” and “the term is not indefinite when it serves reasonably to describe the scope of the subject

matter and to distinguish it from the prior art.” (Verve LLC v. Crane Cams Inc., Fed. Cir., No 01-1417, November 14, 2002). Thus, the term “substantially perpendicular” is not indefinite and is consistent with the specification. (See MPEP 2173.05(b); and Application, Page 9, lines 3-6).

In view of the foregoing, the Examiner is respectfully requested to withdraw these rejections.

III. THE PRIOR ART REJECTIONS

A. The § 103(a) Rejections of Claims 1-11 and 13-27

First, the references, separately, or in combination, fail to teach, disclose or provide a reason or motivation for being combined. In particular, the Admitted Prior Art (“APA”) pertains to a tape carrier-type semiconductor device including a flexible substrate connected to a liquid crystal panel and a print substrate with a single stress releasing slit. APA attempts to solve warping of the flexible substrate during manufacturing caused by two different stresses generated by different expansion coefficients of the resin on one side surface and the solder resist on another side surface of the flexible substrate through a stress-releasing slit. (See Page 1, line 10-Page 2, line 20; and Figures 10A and 10B).

By contrast, Japanese Laid Open Patent Publication (“JLOPP”) (HEI 6-196609) does not have the same aim as the APA.

JLOPP discloses a semiconductor device with a lead frame including at least two semiconductor package units and a plurality of slits having multiple connectors, which attempts to solve the problem of deformation of the lead frame outer frame caused by the pressure of the resin on the lead frame when forming at least two semiconductor package units on the lead frame at the time of a mould. (See JLOPP at Purpose; and Paragraphs

[0014], [0015] and [0031]).

Nothing within JLOPP, which pertains to preventing deformation of the lead frame outer frame due to pressure of the resin on the lead frame when forming at least two semiconductor package units using a plurality of slits, has anything to do with attempting to solve the problem of warpage of the flexible substrate due to different coefficients of expansion of the resin and the solder resist on opposite surfaces of the flexible substrate when using a single stress releasing slit as disclosed in the APA. Clearly, APA does not teach or suggest including a plurality of slits with multiple connectors as disclosed in JLOPP. An attempt to combine references, as suggested, and substitute a plurality of slits from JLOPP with the current structure of a single stress releasing slit from APA, may likely change the function of the APA by making the flexible substrate too flexible, which would teach against providing a more rigid surface. Thus, APA teaches away from being combined with another invention, such as, JLOPP.

Therefore, one of ordinary skill in the art would not have combined these references, absent hindsight. It is clear that the Examiner has simply read Applicant's specification and conducted a keyword search to yield the Admitted Prior Art and JLOPP. Further, the Examiner provides no motivation or reason to combine other than to assert that it would have been obvious to one having ordinary skill in the art at the time "to enable the first slits of [A]APA to be formed." (See Office Action at Page 3, Paragraph 2). Such an assertion does not take into account the distinct structural differences of the APA and JLOPP as indicated above, and further discussed below. Thus, the Examiner's assertion attempts to solve a potential problem which does not ever exist with either the Admitted Prior Art or JLOPP, and this assertion is further proof of the Examiner's use of impermissible hindsight

Second, even if combined, the references do not teach or suggest the features of

independent claims 1, 10, and 13, including the first slit includes a first sub-slit and a second sub-slit with the connector therebetween. (See Page 3, lines 9-21; Page 8, lines 25-Page 9, line 6 and lines 17-23; and Figures 4 and 9).

The Examiner also admits that the APA does not disclose, teach or suggest “the flexible substrate includes a rib formed ‘substantially’ perpendicular to the plurality of the first slits,” for example as recited in claims 8 and 17. (See Office Action at Page 3, 3rd Paragraph).

Applicant further traverses the assertion that APA teaches “the first slit comprises a first sub-slit and a second sub-slit.” (See Office Action at Page 2, Paragraph 5). APA discloses, and Figures 10A and 10B clearly show, a single stress releasing slit without any intermediate connector, as acknowledged above, let alone, two sub-slits with a connector intermediate the sub-slits, i.e., where the first slit is a first sub-slit and a second sub-slit with the connector therebetween as recited in the invention. (See Office Action at Page 2, Paragraph 5).

Third, JLOPP does not make up for the deficiencies of the APA.

JLOPP does not disclose a feature of claims 1, 10 and 13, including the first slit includes a first sub-slit and a second sub-slit with the connector therebetween. JLOPP also does not disclose the flexible substrate includes a rib formed substantially perpendicular to the first slit as with claims 8 and 17 of Applicant’s invention. In addition, the Office Action does not assert or suggest that JLOPP includes such features.

Instead, as indicated, JLOPP discloses a semiconductor device with a lead frame including at least two semiconductor package units and a plurality of slits having multiple connectors, but without any sub-slits and a connector therebetween. JLOPP also does not teach or disclose ribs, let alone, a rib formed substantially perpendicular to the first slit. (See

JLOPP At Abstract; Detailed Description, Paragraphs [0017]-[0027]; and Figure 1).

Accordingly, JLOPP attempts to provide a significant amount of flexibility through this structure while attempting to maintain some form of rigidity due to the application of the resin when forming the semiconductor package units at the time of the mould.

To make up for the deficiencies of APA and JLOPP, the Examiner relies on Kim, et al. ("Kim"). Kim fails to do so.

First, Kim, which pertains to a liquid crystal device with a flexible portion without any sub-slits and a connector therebetween is focused on reducing the overall volume of an electronic apparatus while "providing an enlarged display screen size without deteriorating display quality," does not have the same aim as either APA or JLOPP, as discussed above. Thus, the urged combination would not have been made, absent hindsight. (See Kim at Abstract; and Column 1, lines 15-45).

Secondly, Kim does not disclose, teach or suggest including the first slit includes a first sub-slit and a second sub-slit with the connector therebetween as recited in claims 1,10 and 13.

Instead, in Figures 1-5d of Kim, Kim recites a liquid crystal device including a flexible portion with a reinforcement plate oriented on the flexible portion without any sub-slits and a connector therebetween whereas Applicant's invention discloses a first slit includes a first sub-slit and a second sub-slit with a connector therebetween. Applicant's invention also discloses a "flexible substrate includes a rib formed substantially perpendicular to the first slit," as recited in claims 8 and 17 of Applicant's invention. Kim further disclose that the reinforcement plate is disposed on the "outer surface of the liquid crystal cell"... "to maintain a shape of the LCD device" whereas Applicant discloses a rib to reduce warpage of

the tape carrier type semiconductor device. (See Kim, Column 3, lines 15-27; and Application, Page 8, lines 23-27). Thus, Kim does not disclose or teach, including the first slit includes a first sub-slit and a second sub-slit with the connector therebetween as recited in claims 1, 10 and 13 of the invention. Since the flexible liquid crystal display does not include any sub-slits with a connector therebetween, Kim is also deficient and thus does not teach the specific limitations of dependent claims 2-7, 9, 11, 14-16, and 18-27.

Consequently, the conventional AAPA, JLOPP and Kim structures are unsuitable for achieving at least one object of the invention, which includes reducing “the warp of the tape carrier type semiconductor device” caused by the two different heat expansion coefficients of the resin and the solder resist exerted on the flexible substrate during manufacturing, and thus preventing the outer terminal from detaching from the print substrate and the liquid crystal panel. Therefore, the tape carrier type semiconductor device is easily manufactured and unlikely to warp . (See Page 1, line 27-Page 2, line 3; Page 2, lines 24-26; Page 3, lines 9-13; Page 6, lines 13-17; Page 8, lines 10-15; lines 25-Page 9, line 6 and lines 17-23; and Figures 4 and 9).

For at least the reasons outlined above, Applicant respectfully submits that none of APA, JLOPP or Kim teach or suggest all of the features of the independent claims 1, 10 and 13, and related dependent claims 2-9, 11 and 14-27, which are patentable not only by virtue of their dependency from their respective independent claims, but also by the additional limitations they recite.

For the reasons stated above, the claimed invention, and the invention as cited in independent claims 1, 10 and 13, should be fully patentable over the cited references.

IV. FORMAL MATTERS AND CONCLUSION

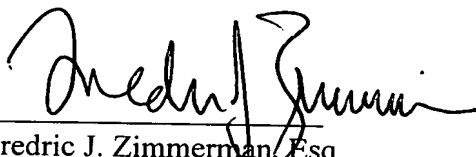
In view of the foregoing, Applicant submits that claims 1-11 and 13-29, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

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